Technological innovation

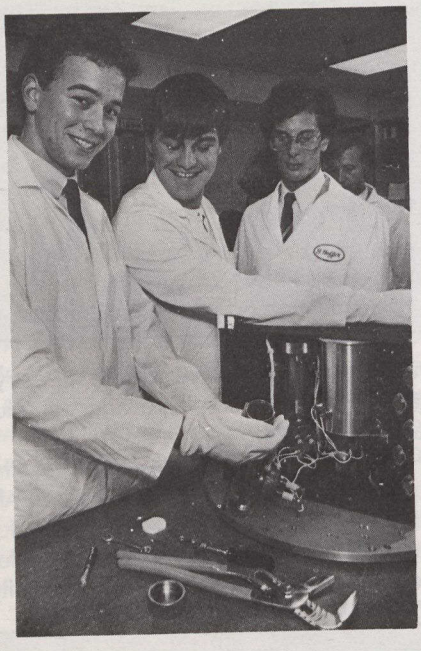
Quality mirrors made in space

An experiment designed by two Canadian students, Daniel Rey and Jean-François Deschênes, has successfully produced shiny silver mirrors in space, beyond the disruptive influences of gravity. The mirrors were manufactured in six metal canisters aboard the space shuttle *Atlantis* which was sent into orbit on November 26.

The students designed the experiment with Telesat Canada engineers. It was part of their proposal which won Telesat Canada's Get Away Special Contest for high school students in 1983, to test whether mirrors made in the near-zero gravity of space have smoother reflective surfaces than earth-made mirrors.

Using the equipment from the space shuttle, the experiment has been re-activated to create a set of earth-made mirrors as a basis for quality comparison. Both sets of mirrors will be tested at different laboratories to determine if the made-in-space mirrors are smoother and more reflective than the control set.

The quality of mirrors is important to scientists who depend on fine precision instruments such as microscopes and lasers.



Bruno Schlumberger, *The Citizen*

Daniel Rey (left) *and Jean-François Deschênes* (centre) *examine the mirrors that were produced in space according to an experiment they designed.*

Dumping demands met by new design

An advanced model RD-150 *articulated rear dump hauling unit which can be attached to off-highway tractors or trucks that can be converted to tractors, has been introduced by Atlas 2000 Inc. of Montreal, Quebec. The new design includes improvements in hydraulic cylinder design and a hydraulic circuit to increase the dump cycle time. There is also greater manoeuverability as the draft arm assembly of the unit was designed as three components rather than a full weld design. The two arms are fitted to double pins for alignment, then bolted to the rugged centre beam.*

High-tech train on track

Canada's first microprocessor-controlled locomotive, the *SD60F* has been presented to Canadian National Railways by General Motors (GM) of Canada Ltd., Oshawa, Ontario.

Irwin Schinkel, a GM spokesman said the company is confident the technologically-sophisticated transportation vehicle will prove successful in the railway industry.

The $2-million locomotive uses three Motorola 6803 microprocessors to control, monitor, and even correct its operation.

The "logic" microprocessor controls the locomotive's direction, motor switching, engine speed and other functions previously governed by relays and wire harnesses.

A second computer sets power and brake operating ranges, based on throttle and brake information received from the logic system. It also increases rail traction 33 per cent over the traction of GM's previous locomotive, the *SD40-2*.

The third microprocessor controls a menu-driven diagnostic system that monitors operation and analyzes failures. Throttle position, speed, and other conditions are recorded the moment a fault occurs, making it easier for repair workers to find the component and cause.

In some cases, the computer can correct faults. For example, engine power automatically is reduced if the locomotive's cooling water overheats.

The microprocessor also records mileage, kilowatt-hours, and other operational data that allow maintenance schedules to be based on actual work done.

Three *SD60Fs* are able to replace four *SD40-2s* pulling loads of equal size.

Low-cost insulated glass

Tempa Industries Limited of North Vancouver, British Columbia, has begun to develop a low-cost insulating glass technology that was conceived at Simon Fraser University in Burnaby, B.C.

Gary Bruendl, Tempa's president, said the company hopes to begin manufacturing insulated double windows by next August.

The technology involves heating glass in a horizontal furnace and coating it with a transparent film of tin oxide. The film allows visible light to enter but stops radiative heat from escaping.

Within three years, Tempa hopes to introduce defrosting windows that will take advantage of the film's ability to conduct electricity.